

WHAT IS CLAIMED IS:

- 1 1. A method for decreasing required radio spectrum in a
2 communication system using variable bandwidth, the method
3 comprising:
4 dividing radio frequencies of the communication system
5 into a wideband channel radio frequency and narrowband channel
6 radio frequencies; and
7 communicating user data using both the wideband
8 channel radio frequency and the narrowband channel radio
9 frequencies.

- 1 2. The method of claim 1, wherein a higher frequency re-
2 use factor is applied to said narrowband channel radio frequencies.

- 1 3. The method of claim 1, wherein at least in some cells of
2 the communication system both the narrowband channel radio
3 frequencies and the wideband channel radio frequency are allocated
4 so that the narrowband channel radio frequencies are used to extend
5 cell range.

- 1 4. The method of claim 1, wherein the narrowband channel
2 radio frequencies are divided among adjacent communication cells in
3 such a way that adjacent cells are using different narrowband channel
4 radio frequencies.

- 1 5. The method of claim 1, wherein the narrowband channel
2 radio frequencies are located outside the wideband channel.

1 6. The method of claim 5, wherein the narrowband channel
2 multiple access method incorporates spreading as a means to
3 implement spectrum sharing between adjacent cells.

1 7. The method of claim 1, wherein the narrowband channel
2 radio frequencies are located inside the wideband channel radio
3 frequency.

1 8. The method of claim 1, wherein at least one of the
2 communication cells includes a repeater configured to operate using
3 both wideband channel radio frequencies and narrowband channel
4 radio frequencies.

1 9. The method of claim 1, further comprising transmission
2 of communication scheduling information using a narrowband channel
3 radio frequency.

1 10. The method of claim 9, wherein scheduling information
2 includes terminal identity for a terminal that will use a channel.

1 11. The method of claim 1, wherein use of the wideband
2 channel radio frequency is coordinated.

1 12. The method of claim 1, wherein the narrowband channel
2 radio frequencies are assigned to different communication cells.

1 13. A wireless communication system using variable
2 bandwidth to increase re-use of frequency channels in the wireless
3 communication system, the system comprising:
4 a mobile station having a receiver and a transmitter, the
5 receiver and transmitter being configured to adaptively sample
6 frequency and bandwidth; and

7 a base station having a receiver and a transmitter, the
8 receiver and transmitter being configured to adaptively sample
9 frequency and bandwidth.

1 14. The system of claim 13, wherein communication
2 between said mobile station and said base station can take place
3 utilizing at least two different frequency carrier bandwidths;
4 narrowband and wideband.

1 15. The system of claim 14, wherein narrowband carriers are
2 used in communication between the mobile station and base station
3 to enable higher re-use of frequency channels without multiplying
4 operator spectrum requirements.

1 16. The system of claim 14, wherein the narrowband carriers
2 are outside a full bandwidth channel.

1 17. The system of claim 16, wherein the narrowband carrier
2 or narrowband carriers outside the full bandwidth channel implement
3 spreading.

1 18. The system of claim 14, wherein the narrowband carriers
2 are inside a full bandwidth channel.

1 19. The system of claim 14, wherein the mobile station
2 utilizes multiple antennas.

1 20. A device operable in a wireless communication
2 environment and configured to utilize variable bandwidth, the device
3 comprising:
4 a radio interface configured to communicate with base
5 stations in a wireless communication environment; and

6 a processor coupled to the radio interface, the processor
7 providing commands to modulate at least two transmission and
8 receive bandwidths: wideband and narrowband.

1 21. The device of claim 20, wherein the narrowband carriers
2 are inside a full bandwidth channel.

1 22. The device of claim 20, wherein the narrowband carriers
2 are outside a full bandwidth channel.

1 23. The device of claim 22, wherein the narrowband carrier
2 or narrowband carriers outside the full bandwidth channel implement
3 spreading.

1 24. The device of claim 20, further comprising multiple
2 antennas.